



STATE OF MICHIGAN
DEPARTMENT OF COMMUNITY HEALTH
LANSING

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July 8, 2014

Jeffrey Lippert
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9311 Groh Road
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Mr. Lippert:

As the U.S. Environmental Protection Agency (EPA) On-Scene Coordinator for the Michigan Gas Utilities site, you requested MDCH evaluate the soil gas and air data collected from 78 W. Chicago Street, Coldwater, Michigan, presented in the “Final Trip Report for Indoor Ambient Air Monitoring, Vapor Intrusion Sampling, Soil Gas Sampling, and Assessment Activities Conducted at the Michigan Gas Utilities Site” report. My conclusions and recommendations are below.

Background

A manufactured gas plant (MGP) operated adjacent to 78 W. Chicago Street, Coldwater, Michigan, from the late 1870s to the mid-1920s. From approximately the late 1870s to the late 1960s or early 1970s, an administrative building for the MGP was located at 78 W. Chicago Street. Currently, a retail store is at this location.

Soil and groundwater sampling was carried out on the property adjacent to 78 W. Chicago Street between June 2012 and September 2013. Access to the property at 78 W. Chicago Street could not be obtained for that sampling. Sixteen surficial soil (0.5 to 2.5 feet below ground surface [bgs]) and 23 subsurface soil (5 to 20 feet bgs) samples were collected. Polycyclic aromatic hydrocarbons (PAHs)¹ were found above the Michigan Department of Environmental Quality’s (MDEQ) Nonresidential Direct Contact Criteria in four of the surficial soil samples. Benzene, xylenes and naphthalene levels in one of the surficial soil samples were above the MDEQ’s Nonresidential Soil Volatilization to Indoor Air Inhalation Criteria (Pescador, LLC, 2014)².

PAHs³ and/or benzene were also found above the MDEQ’s Nonresidential Direct Contact Criteria in two subsurface soil samples. Benzene, toluene, xylenes, and naphthalene were above the MDEQ’s Nonresidential Soil Volatilization to Indoor Air Inhalation Criteria in one subsurface soil sample (Pescador, LLC, 2014).

¹ The PAHs were benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Not all of these chemicals may have been elevated in the same samples.

² Pescador, LLC. 2014 “Michigan Gas Utilities Corporation Former Chicago Street MGP Remedial Investigation III Supplemental Report” Prepared for Integrys Business Support, LLC.

³ The PAHs were benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, or dibenz(a,h)anthracene. Not all of these chemicals may have been elevated in the same samples.

Arsenic or tetrachloroethene were identified above MDEQ's Nonresidential Drinking Water Criteria in five out of 19 groundwater samples (Pescador, LLC, 2014).

Discussion

All data in this section are from the 2014 Tetra Tech, Inc. report⁴. Air monitoring, indoor and outdoor air sampling, and soil gas sampling were carried out in May 2014 at the property located at 78 W. Chicago Street. This property is used as a retail store and the basement is used as a storage and lounge area.

Levels of total volatile organic chemicals (VOCs), measured with a MultiRAE Pro, in the basement ranged from 0 to 160 parts per billion (ppb), with a level of 280 ppb detected inside a borehole in the slab (sampling location). Monitoring was also done for carbon monoxide, hydrogen sulfide, and lower explosive limit. None of these parameters were detected. Benzene, measured with an UltraRAE 3000, was also not detected.

Indoor and outdoor air sampling data was compared to the EPA May 2014 Regional Screening Levels⁵ table for ambient air (with a target risk of 1×10^{-6} and a target hazard quotient of 0.1). Although the screening levels for an industrial scenario (8 hours a day for 250 days per year for 25 years) are appropriate for the use of the building, residential screening levels were also used to be protective of people with increased exposure, such as the store owners. Data were compared to screening levels for both an industrial and residential scenario.

The single outdoor air sample was collected over a 24 hour time frame at a location within 25 feet of the north side of the building. This sample location is near a parking lot. Of the 10 chemicals detected, only benzene levels were over the screening level for residential air (0.36 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]). The benzene level ($0.41 \mu\text{g}/\text{m}^3$) was not over the screening level for industrial air ($1.6 \mu\text{g}/\text{m}^3$). Two indoor air samples were collected in the basement of the building over a 24 hour timeframe. Only acetone, ethanol, methylene chloride, and hexane were detected in the indoor air samples, but none were over residential or industrial air screening levels⁶.

Soil gas samples were compared to the EPA's Vapor Intrusion Screening Level calculator⁷, adjusted for a target risk of 1×10^{-6} and a target hazard quotient of 0.1. Three soil gas samples were collected in Tedlar bags from sampling locations outside of the building. No chemicals were measured above the residential or industrial (commercial) soil gas screening levels in these samples; however, 1-liter Tedlar bags are not suitable for detecting low chemical levels.

Five basement sub-slab soil gas samples were collected, in Summa canisters, from the building at 78 W. Chicago Street. Chemicals were detected over the screening levels in three of the samples.

⁴ Tetra Tech, Inc. 2014 "Final Trip Report for Indoor Ambient Air monitoring, Vapor Intrusion Sampling, Soil Gas Sampling, and Assessment Activities Conducted at the Michigan Gas Utilities Site – Revision 2" EPA Contract No. EP-S5-13-01, Technical Direction Document No. S05-0001-1405-006, Document Tracking No. 0018.

⁵ The EPA RSL tables can be found at <http://www.epa.gov/region9/superfund/prg/>.

⁶ There are no air screening levels for ethanol. However, the National Institute for Occupational Safety and Health recommended exposure limit for ethanol is a time-weighted average of $1,900,000 \mu\text{g}/\text{m}^3$ for a 10 hour workday. The maximum ethanol detection was $44.74 \mu\text{g}/\text{m}^3$.

⁷ The EPA's Vapor Intrusion Screening Level calculator can be found at <http://www.epa.gov/oswer/vaporintrusion/guidance.html#Item6>.

For all of the chemicals, except benzene, the detected levels were over both the residential and industrial soil gas screening levels. The highest benzene and tetrachloroethene levels were from one duplicate sample, collected over the same time frame from the same borehole. One duplicate had levels of benzene ($0.61 \mu\text{g}/\text{m}^3$) and tetrachloroethene ($8.82 \mu\text{g}/\text{m}^3$) below both the residential and industrial soil gas screening levels while the other sample had benzene ($5.77 \mu\text{g}/\text{m}^3$) and tetrachloroethene ($309.90 \mu\text{g}/\text{m}^3$) over the screening levels. Table 1 presents the chemicals detected above the screening levels.

Table 1: Detected chemicals over the soil gas screening levels in 24 hour soil gas samples collected at 78 W Chicago St, Coldwater, MI (Tetra Tech 2014).

Chemical	Range (in $\mu\text{g}/\text{m}^3$)	Residential soil gas screening level (number of samples over the screening level/total samples)	Industrial soil gas screening level (number of samples over the screening level/total samples)
Chloroform ^a	ND ^b – 38.99	1.2 ^c (2/5)	5.3 ^c (2/5)
Benzene	0.38 – 5.77	3.6 ^c (1/5)	16 ^c (0/5)
Bromodichloromethane ^d	ND – 24.12	0.76 ^c (2/5)	3.3 ^c (2/5)
Tetrachloroethene	1.83 – 309.90 ^e	42 ^f (3/5)	180 ^f (3/5)

a = Chloroform was detected in three of the five samples.

b = The chemical was not detected (ND).

c = These screening levels were calculated for a target risk of 1.0×10^{-6} for carcinogens

d = Bromodichloromethane was detected in two of the five samples.

e = The maximum value of $309.90 \mu\text{g}/\text{m}^3$ is not over the industrial soil gas screening level set for a target hazard quotient of 1.0 ($470 \mu\text{g}/\text{m}^3$).

f = These screening levels were calculated for a target hazard quotient level of 0.1 for non-carcinogens.

Three of the four soil gas screening levels, for chloroform, benzene, and bromodichloromethane, were calculated based on potential cancer risk. Tetrachloroethene screening levels were calculated for a target hazard quotient (noncancer effects). Tetrachloroethene was detected in all five Summa canister samples, with three over the soil gas screening levels (with a target hazard quotient of 0.1). The maximum value of $309.90 \mu\text{g}/\text{m}^3$ is not over the industrial soil gas screening level calculated with a target risk of 1.0×10^{-6} ($470 \mu\text{g}/\text{m}^3$)⁸. It is important to note that, although the levels of these four chemicals were elevated in certain soil gas samples, none of these chemicals were detected in the two indoor air samples in the basement.

Conclusions

MDCH cannot determine if people's health could be harmed from breathing in chemicals in the indoor air at 78 W. Chicago Street as people's exposure is uncertain. Based on the currently available information, there is the potential for vapor intrusion in the building at 78 W. Chicago Street from chemical contamination at or near that location. Benzene was elevated in one soil gas sample; chloroform and bromodichloromethane were elevated in two samples; and levels of tetrachloroethene were elevated in three samples, but below industrial soil gas screening levels

⁸ The screening level for the target hazard quotient of 1.0 was also calculated for tetrachloroethene as all the chemicals in the table do not necessarily affect the same target organs. A target hazard quotient of 1.0 in the calculation results in a screening level higher than one based on target risk (carcinogenic effects), so the lower screening level was selected. The maximum level of tetrachloroethene is over the residential soil gas screening level calculated with a target risk of 1×10^{-6} ($110 \mu\text{g}/\text{m}^3$).

calculated with a target risk of 1×10^{-6} . However, none of these chemicals were detected in the two indoor air samples. It should be noted that all data is from a single sampling event.

Recommendations

MDCH recommends that additional sampling be done to further evaluate the potential vapor intrusion after the proposed remediation work is completed. Remediation work is scheduled to be done at the adjacent property this summer. This work will include air monitoring or sampling for the chemicals of interest. Additional soil gas and indoor air sampling is needed confirm whether source material removal reduced or ended the potential for vapor intrusion.

Public Health Action Plan

MDCH will remain available to evaluate any further sampling plans or data.

Please contact me (517-373-7672 or grayj@michigan.gov) if you have any questions regarding these conclusions and recommendations.

Sincerely,

A handwritten signature in purple ink that reads "Jennifer Gray". The signature is written in a cursive, flowing style.

Jennifer Gray, Ph.D.

CC: Linda D. Dykema, Ph.D., Environmental Public Health Director, Michigan Department of Community Health

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